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LOST IN THE CLOUD: ATTEMPTING TO IMPROVE THE IMPLEMENTATION OF EDUCATIONAL TECHNOLOGIES

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by

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CHAPTER ONE

Introduction

Lost In The Cloud

The title of this project, *Lost in the Cloud*, only partially describes the expressions that I've seen on students' faces when they are approached about organizing the digital aspects of our curriculum. I was working in a public middle school specifically with seventh and eighth grade science classes when I noticed a peculiar development. Nearly one-third of my students would be failing until the end of the quarter when they begged, scrambled, and mustered up enough course work to get a good grade. I had only recently secured tenure and still considered myself a rookie teacher. Upon further reflection, I realized this pattern was increasing. I began polling students that were consistently playing catch-up and the findings were remarkable. This wasn't simply a pattern in my class for them; it was systemic in all classes increasing implementation of technology in their curriculum. I would ask these same students to show me how they organize assignments and due dates. The responses ranged from blank stares to clear signs of emotional distress. Why were they so confused? Each of the classes had their own way to distribute digital content. I would sit down with students and walk through assignment due dates and what each assignment involved. After perusing eight different classes I was admittedly just as confused. This would eventually lead me to the research question of this capstone project "*how can teachers improve the efficacy of digital content for an equitable class?*" Chapter one will provide a context and rationale for the research and project that resulted from this question.

Teachers in our school were practicing most of the strategies that were presented to us through professional development workshops. My peers and I were using new applications of technology to change the ways that students were learning. We were all using the same learning management system (LMS) to communicate class information to students and their families. However, we had been using a different system with a frustratingly similar name to communicate attendance and official grades amongst other things. Staff was now logging into several different systems to navigate our professional world and it took me a long time to figure out as a new teacher. I couldn't help but wonder how new students would feel in our classrooms with all of the different types of digital work. Further, if the student was learning English?

The concept itself provides ample confusion if you decide to search the internet for *the cloud*. When someone mentions the cloud they are commonly referring to cloud computing which is eloquently analogized to an amorphous cloud that is the combination of hardware and software that is managed by a provider rather than the user. Could the issue with our students being lost in the cloud come from above? The entire district had recently become a one-to-one district, meaning that each student was equipped with their own digital device. District administrators had invested a lot of money, time, and energy into a vision for using cutting-edge technology for transformative learning. The district spelled out a vision and a mission for technology that included popular education terms like personalized learning, innovative instruction, and effective, efficient infrastructure. Professional development days and workshops were mottled with developing strategies for using technology in the classrooms. The district posted technology beliefs outlining

innovative instructional practices, digital curriculum, and ways that technology would promote and enhance daily operations. The technology was made available and all of the tools to move forward with such a vision were present. This sounded like a great path to take and our district was far from being the first to implement a one-to-one program. Yet I still wondered what was missing for those children that were consistently lost in the cloud.

Myself In The Cloud

I am part of a unique generation that still remembers rotary-dial phones, typewriters, and the first floppy disk. As I progressed through elementary and secondary school, I witnessed the advent of the internet. I did one-term at a local university before leaving to work in a trade for a few years. I came back to college as a *non-traditional student* which meant I had taken a break from school. I was shocked when I came back and found much of the coursework was now completed and submitted digitally. I remember struggling for at least the first year just to learn the basics of navigating the new system.

After earning an Associate of Arts at a community college I attended a university that used a completely different system, and this time the courses were more difficult. My graduate school had another system. As I moved into the profession of teaching, I felt no anxiety when in my first three years I did all of my lessons through one LMS and we switched to a different one a year later. Though up to this point, most of my co-workers had very little experience with the frustrations that arise with adapting to new technologies. My adventures from paper to the cloud have made me more adaptable to

new technologies. With this skill set, I have been able to quickly jump into new digital platforms with a critical perspective regarding the numerous ways it could be used by others to amplify their lessons or contrastingly confuse the learning process.

Co-Workers & The Cloud

As a new teacher, I was accustomed to seeking advice from my co-workers. It was always interesting to see how each person managed their work. For the sake of brevity, I will focus on two peers that seemed polarized when it came to opinions on technology in the classroom. One teacher had been in the profession for over thirty years and had recently become eligible to retire. I will refer to this teacher as Mr. Ready for anonymity purposes. In short, Mr. Ready was minimally meeting requirements for technology use in the class. His teaching philosophy was clear: technology was distracting students and had become a burden for his workload. His claim was that students did better in his class when they worked out of physical books, worksheets, and assessments. Mr. Ready's middle school students rarely had missing work. He explained to me that it was because he would collect all of the work before students left his room. There was rarely any homework. Quizzes or tests were designed for every student to be able to finish within the hour. It was as if students would have to put effort into failing his class.

This was not the case for my other co-worker, whom I will refer to as Dr. Lovett. Contrastingly, this class was an all-digital curriculum. Dr. Lovett was implementing advanced personalized learning strategies with data-driven decisions, self-paced work, student choice, and a rigorous workload. The class required students to learn about

accountability, organizational strategies, academic language, and many more skills having to do with managing their own grades. Many students began the year complaining about the workload and the amount of responsibility needed to demonstrate to achieve a good grade. By the end of the year, the class would run like a well-oiled machine and the students were the center of the class with an active guiding teacher. However, there were still some students that had trouble grasping the digital platform of due dates and long lists of tasks to complete.

Mr. Ready and Dr. Lovett were each considered to be exceptional in their profession and both of them had strikingly different styles of teaching. I wondered if the solution to our problem might lie between the two viewpoints. Most students would have both teachers and manage both styles of learning. One class would have all of their work in the cloud while the other was almost entirely paper copies. Throw in six more classes with varying amounts of technology and a wide range of teaching styles and the result can be overwhelming. I was beginning to realize that we as a team were missing a common thread that would tie all classes together in terms of expectations for readiness and responsibility.

Families In The Cloud

It turned out that students and staff were not the only ones feeling overwhelmed. Parents/Guardians would come to conferences and rather than talking about student progress we would spend most of the time figuring out how to manage the different technology platforms we were running. Students had one login for finding official grades along with a schedule, locker info, and attendance and a separate one to see our LMS

which updated more frequently with coursework and assignment status but only if that's what the teacher was using. Some teachers call, some email, some put notifications in an ap, and there are still teachers that will write home.

I began wondering if families could even help their students with digital homework. Students that had previously brought a book and worksheet home with them are now presenting a tablet and asking for help. Friends of mine that have children admitted that they wouldn't be able to help their kids with homework until they figured out the device. Imagine a student frustrated with homework and a parent equally frustrated with the technology being used. It seemed like technology was proving to be more problematic than beneficial for some families.

Summary

Cloudy With A Chance For Redemption

My professional experiences noted systemic problems that should not be ignored. Personal experiences illustrated my willingness to use and adapt to new educational technologies. Stakeholders that might benefit from this study are the students, teachers, administration, and families in schools that are implementing technology in their classrooms. My hope for this project is to shed some light on ways that schools could avoid running into the same problems regarding being lost in the cloud. Additionally, I hope for my existing community to find their own unique solutions. Up to this point, I had known very little about the policies surrounding technology in classrooms. Data regarding the effective usage of educational technology seemed scarce and my desire to learn about the impacts was growing. For these reasons, chapter two will review literature

involving policies in place to support the effective implementation of educational technology.

CHAPTER TWO

Literature Review

Introduction

The purpose of this chapter was to analyze publications while attempting to answer the question "*how can teachers improve the efficacy of digital content for an equitable class?*" The chapter is organized into three main themes: *The Score is One-to-One*, *Approaches to Digital Learning*, and *Electronically Equitable Education*. The first section aims to provide background information regarding technology use in classrooms ranging from a national movement in the early 1980s to current progress in providing devices and access to every student in the country. The second section cites publications that help paint a picture of how technology was currently being used to transform how educators teach and students learn. The final section is focused on ways technology could alter how educators, policymakers, and the public viewed equitable education. This chapter summarizes the main ideas at the terminus. It was important to note that due to the rapid rates of change in technology the focal points of this discussion were through the lens of a bigger picture rather than specific applications of technology.

The Score Is One-to-one

Rationalizing Technology In The Classroom

In April of 1983, President Ronald Reagan's National Commission on Excellence in Education (NCEE) concluded that we were *A Nation at Risk*. The Secretary of Education, Terrel Howard Bell, formed the commission in response to overwhelming public concern that the nation's education system was failing its people. The purpose was

to assess the state of the nation's schools over the course of two years and report their findings back to the secretary and the public. This landmark event for modern education reported "We have, in effect, been committing an act of unthinking, unilateral educational disarmament" (NCEE, 1983, p. 3). They continued to describe the shortcomings of the education system and how it was failing to prepare the public for gainful employment which in turn benefits society as a whole. The commission highlighted inadequate scores and alarming statistics that shook the public's confidence as the need for a tech-savvy workforce was increasing. The report listed the following reasons for concern:

- Computers and computer-controlled equipment are penetrating every aspect of our lives—homes, factories, and offices.
- One estimate indicates that by the turn of the century millions of jobs will involve laser technology and robotics.
- Technology is radically transforming a host of other occupations. They include health care, medical science, energy production, food processing, construction, and the building, repair, and maintenance of sophisticated scientific, educational, military, and industrial equipment.

The prescribed plan of action from this public statement included an emphasis on the importance of science, engineering, and technology throughout the public education system (NCEE, 1983). Many schools began putting computers in schools, followed by entire computer labs, eventually leading to carts full of laptops or tablets. *A Nation at*

Risk was not the impetus of putting technology in classrooms but it fueled a charge toward ensuring students had ample opportunities to become proficient users.

The Rise Of One-to-one Schools

The phrase one-to-one has become common across the country. By 2018, a majority of schools required students to use computers, tablets, or other mobile devices (Cavanagh, 2018). The differences between one-to-one schools and the predecessors were that every student ideally had immediate access to digital course content, and students could gain technical skills and literacy that better prepared them for their futures (Partnership, 2013). The simplicity of the coin-phrase one-to-one ended up being more complex as it had been surrounded by debate since its inception. Arguments for and against this common goal discuss the topics of finances, equity, student responsibility, tech-support, instructional time, training, etc. Whether a consensus was reached or not, schools had continued to invest a great deal of time and resources toward one-to-one classes. The conversations resulting from said arguments afforded the public a critical eye as we continued experimenting with the integration of new technology in schools (Partnership, 2013).

Building and maintaining a classroom learning community has been valued as one cornerstone of effective teaching. A myriad of benefits has been outlined as improving the efficiency of learning, the effectiveness of teaching, and bolstering innovative practices (Partnership, 2013). Lessons have become more personalized and catered to each student. Others have argued that technology has decreased the effectiveness of

teachers due to the lack of personal connection thus undermining the foundational requirement of building a classroom community (Sadker & Zittleman, 2010, p. 412-413).

Most effective teachers recognized that students require variety in both the process and content of lessons (Sadker & Zittleman, 2010). Digital and online classroom resources had become overly abundant. One-to-one classrooms allowed teachers and students to access new learning tools that were cost-efficient, plentiful, and flexible (Partnership, 2013). Contrastingly, there was an infinite amount of useless information, ads, propaganda, and misguided or ill-informed research to sift through. Many one-to-one schools have utilized filters to block some undesired content from the internet but this tool has proven imperfect. It has become the teacher's responsibility to carefully choose and distribute digital content, monitor students' activity, and educate them on evaluating internet materials (Sadker & Zittleman, 2010).

Resistance Is Futile

Regardless of a teacher's point-of-view in any argument pertaining to the application of new technologies in the classroom, the change was coming. Some teachers were willing and able to adopt technology while many others faced barriers. "Barriers to successful technology adoption appear to have internal and external sources" (Rogers, 2000). Internal barriers like teachers' attitudes or perceptions of technology combined with low levels of competency were slowing the movement toward successfully using technology in the classroom. "Anecdotal evidence and justification for avoiding technology adoption are abundant in any teachers' lounge one might visit" (Rogers, 2000). This was purported to link with external barriers listed as "availability and

accessibility of necessary hardware and software, the presence of technical personnel and institutional support, and a program for staff development and skill building" (Rogers, 2000). Teachers that were avoiding technology were perhaps unaware that the United States Department of Education established the Office of Educational Technology (OET) in 1994 whose goal was to be an organization that developed "national educational technology policy and established the vision for how technology can be used to transform teaching and learning and how to make everywhere, all-the-time learning possible for early learners through K-12, higher education, and adult education" (Office of Educational Technology [OET], n.d.).

The OET began publishing a National Education Technology Plan (NETP) in 1996 which became the "flagship educational technology policy document for the United States." (OET, n.d.) Classrooms were changing across the United States and the OET recognized that policy changes were unavoidable across the board from the local to the national level. The NETP called for not just educators to shift roles but also included the learners and families. The plan was to be released every five years. Due to "rapidly changing circumstances and the pace of technology advancement in our schools" (Office of Educational Technology [OET], 2017) the OET began updating the plan annually starting in 2017. The increased frequency of reports drew attention to how important this topic had become to the country. A need for improved research and support for the successful implementation of technology used in schools had become a priority. "The conversation has shifted from whether technology should be used in learning to how it can improve learning to ensure that all students have access to high-quality educational

experiences." (OET, 2017, p. 7) From this and other reports, it was apparent that the debate was focused on how to implement technology rather than why technology should be used.

Approaches to Digital Learning

The innumerable ways in which digital content could be employed in the classroom might leave students, faculty, and families struggling with the simple logistics of navigating the course. Whether a person is learning online or in person, there is a need for organization. Student engagement continues to be a common goal for teachers across the nation. Effective classroom management necessitates ample time for learning which digital content may actually inhibit if misused. Where clarity of instruction is absent, the learning environment falls apart. According to Hoy (2011), a fundamental building block of an effective classroom is gaining the cooperation of students. To achieve cooperation teachers were called to address a myriad of managerial problems including clarity of instruction, appropriate academic demands, and foreseeing problems to halt them before they start. Lessons and activities should promote interests and flow between topics. These issues were of specific importance when considering how teachers could improve the efficacy of their digital content. If effective classrooms require a focus on more time for learning, teachers will have to ensure that technology doesn't become the roadblock that undermines simple navigation to and demonstrations of understanding of learning objectives.

Progress & Goals

The Office of Educational Technology noted progress over the years in several areas. Technology use was more commonly being used to personalize learning. Students were provided more choices when it came to content, assessments, and pacing, "preparing them to organize and direct their own learning for the rest of their lives." (OET, 2017, p. 7) Technology allowed the learning sciences to better study the ways that students learn and what factors improve successful learning. Additionally, research made important headway on understanding the competencies required in the 21st century. Strides were being made to improve teacher education and training with technology through which teachers gained experience and confidence in their implementation of technology. New software was changing assessments and instruction to cater to learning needs and allow accelerated feedback. The progress toward "ensuring that every school has high-speed classroom connectivity as a foundation for other learning innovations" was of particular note. Since the 2010 NETP report, computing power and availability of educational tools increased as the costs of devices dropped. Physical spaces in the classroom were being adapted to make room for a transformed educational experience. All of these positive changes were taking place across the country yet the OET (2017) noted that "there is still much work to do."

The long list of future goals outlined in the report was in no way extensive given the rate at which schools were changing. Researchers had found a distinct digital divide that persisted among "both formal and informal learning settings and across high- and low- poverty schools and communities" (OET, 2017). A distinction was drawn between achievement gaps due to internet access, the digital divide, and the manner of technology

employment, the *digital use divide*. The latter focused on students that used technology for transformed learning and conversely those who were using technology for "passive content consumption." Students that benefited most from technology were using it in "active, creative ways to support learning." Those that were left behind were using technology to merely accomplish the same pre-digital tasks such as worksheets, quizzes, and the like. Actively involve and engage families.

Other areas to be improved revolved largely around supporting teachers through professional development. There was a call for more efficient evaluations of the technology being used so teachers would be working with the best tools available. It was suggested that schools use technology to improve learning on a daily basis and many need to "accelerate and scale up adoption of effective approaches and technologies." (OET, 2017, p. 7) It became clear that schools and districts needed to work more closely with families while changing to a more digitized learning environment. The importance of preparing students to use technology outside the classroom for learning was also emphasized. The OET reported that "few schools have adopted approaches for using technology to support informal learning experiences aligned with formal learning goals" (2017, p. 8). They noted that new teachers entering the profession felt a lack of confidence to implement technology effectively in the classroom. Although assessments had the potential for drastic change, the efficacy could be improved especially in the area of non-cognitive competencies.

Safety had also become a major concern with regard to student data and network security. Difficulty surrounded the idea of protecting student data while still allowing a

practical amount of transparency for schools, students, and families to "personalize learning, advance research, and visualize student progress" (OET, 2017, p. 8). While network security had been improved, there may always be a risk of hacked systems and ransomware. Though there were many areas of progress, problems persisted and goals became as fluid as the fluxing technology industry itself.

Mindsets & Mainframes; A Transformative Experience With Technology

The difference between transformative experiences and passive learning takes us back to the writings of John Dewey (1933). Effective education avoids tasks described as "drudgery" that estranged any truthful meaning of a lesson. Students performing such tasks are only concerned with what they receive at the end. Factual knowledge is vastly different than transformative experiences that move students toward understandings that may be connected and applied in different ways.

The OET reported five focal points of technology and education that were learning, teaching, leadership, assessment, and infrastructure. The goal for the learning section stated "All learners will have engaging and empowering learning experiences in both formal and informal settings that prepare them to be active, creative, knowledgeable, and ethical participants in our globally connected society" (OET, 2017, p. 9). A strong rationale for technology use was made along with the typical conversations about how transformative technology can be when used effectively.

The recommendation to improve non-cognitive competencies was of particular note. It was always important for schools to support and build the social and emotional learning of students. The introduction of technology has drastically changed and

challenged how teachers were approaching this important facet of life. The report claimed that the use of carefully chosen digital games and apps allow students to explore and practice social and emotional learning to "increase empathy, self-awareness, emotional regulation, social awareness, cooperation, and problem-solving while decreasing the number of behavior referrals and in-school suspensions" (OET, 2017, p. 10). Motivation and achievement have been inextricably linked to a person's growth mindset which was another significant part of non-cognitive development. New technologies were affording ample opportunities for students to understand that "abilities can be developed through effort and practice" (OET, 2017, p. 11).

Effort and practice are essential when developing lessons for all types of learners. Bursuck and Friend (2012) suggested providing ample opportunities for students to practice learning strategies through the use of *controlled materials*. These materials were defined by their simplicity in terms of content with a spotlight on generating interest. Students could focus more on learning strategies before attempting to tackle more demanding content. Technology had become another resource to find more options for controlled materials that would foster initial success and lead to increased motivation in the classroom.

The ways in which people learn has not been a directly observable subject and continues to be a moving target. The NETP noted that "learning principles transcend specific technologies" (OET, 2017) and their goal was to focus on illuminating ways in which technology could open doors to new and powerful ways of learning. Technology allowed students to explore and demonstrate learning through more personalized

experiences. Students were being presented with options to choose paths toward understanding the same learning targets through different mediums. New pathways to demonstrate understanding like recording video and audio files, building websites or apps, collaborating through discussion boards, and practicing quizzes with immediate feedback were a few ways in which technology had the potential to transform learning. Teachers have been able to make data-driven decisions for grouping, differentiated instruction, and community building with greater ease due to technology in an effort to enhance learning. The keys to successfully differentiating instruction were described by Wormeli (2007) as "doing whatever it takes to maximize students' learning" by not adhering to a cookie-cutter, whole-class lesson, and guide students to self-advocacy for their future education.

Critical thinking, creativity, collaboration, and leadership have been bolstered with the technology used to immerse students in project-based learning. This type of learning promoted learning through complex, relevant, real-world problems that were authentic and inspiring for students. In lieu of writing a research paper that was only of the eyes of the instructor, students were mobilized to publish content and acquire feedback from other people across the globe. Online discussion forums, live web-chats, short videos, social media, and other platforms drastically changed the ways that students were engaged in real-world project-based learning. (OET, 2017)

Technology has vastly expanded opportunities for students to experience resources outside the walls of their schools and homes. Where teachers and students were once bound to buildings, digital platforms were able to transport them to "opportunities

available in museums, libraries, and other out-of-school settings" (OET, 2017). For example, an event known as the *Global Read Aloud* provided students with an opportunity to connect with students all over the world that were reading the same text and resulted in a deeper understanding of the text through multiple perspectives as well as a globally shared experience with reading (OET, 2017). Additionally, students have been able to pursue their own passions and personal interests using technology. Online tools have enabled learners to seek out broader applications of learning targets from their classes like reading text in different languages or mapping current weather patterns in particular regions. For these reasons, it would be safe to assume that these new tools could help teachers design culturally responsive learning environments. To be a culturally responsive teacher, among other things, one must incorporate each student's unique background from which they construct a stronger base of knowledge that enables them to reach further into the unknown (Koppelman, 2014).

Practicing With Technology

Designing curricula with digital content had become a complex web of responsibilities mottled with trial and error approaches. The path to introducing new digital curricula had fallen squarely on the shoulders of district office staff and the educators themselves. The role of teachers had expanded to include assessing which technologies should be incorporated in their classrooms. The expansion of teacher responsibilities did not bode well in terms of increased stress for new and experienced educators. Khani & Mirzaee (2015) reported that new teachers were more prone to burnout and attrition when demands outweighed resources. The results of increased stress

leading to burnout and attrition were inextricably linked to the experiences of students. A study by Fahlman et al. (2015) collected data about teacher burnout and its relationship with student motivation. Ultimately, they found that students could sense teacher burnout and it had a negative impact on their learning due to decreased student motivation.

The 2017 NETP outlined the goal for teaching with technology as follows: “Educators will be supported by technology that connects them to people, data, content, resources, expertise, and learning experiences that can empower and inspire them to provide more effective teaching for all learners" (OET, 2017). The report emphasized the necessity of providing ample support for teachers as they use technology to enhance their classrooms and professional communications. It called for those that organize pre-service and in-service professional development to “focus explicitly on ensuring all educators are capable of selecting, evaluating, and using appropriate technologies and resources" (OET, 2017). Teachers were now able to easily collaborate with others across the globe including experts, community organizations, online professional learning communities, and other teachers. The NETP suggested that educators had become responsible for trying-out new technology, vetting “tools for privacy and security risks, as well as compliance with federal privacy regulations" (OET, 2017, p. 30). Additionally, these tech-savvy “teacher-leaders” were to work with administrators to support co-workers in their technological endeavors via modeling and being available to respond to their questions.

In an effort to assist schools and districts with evaluating technology applications, the U.S. Department of Education contracted Mathematica Policy Research to develop

“rapid-cycle quick-turnaround evaluations using the Ed Tech Rapid Cycle Evaluation Coach" (OET, 2017, p. 30). The program did not cost anything from the user although each evaluation was estimated to take about 3 months from start to finish (Ed Tech Rapid Cycle Evaluation Coach [ETRCE], 2016). Utilization of the RCE Coach process seemed to demand time and resources that were not previously accounted for by many district offices. The recipe to determine the effectiveness of a particular technology demanded a controlled study using district assessment scores as a measure and a list of participants. The OET (2017) claimed this tool along with others like the *Institute of Education (IES) Low-Cost, Short-Duration Evaluation* were efforts made through the government to give timely feedback to school and district leaders to make well-informed decisions about which technologies are most effective.

It had become clear to the OET that it was time to rethink how teachers were being prepared for the profession and how they were being supported as technology made its way toward every classroom. “Effective use of technology is not an optional add-on or a skill that we simply can expect teachers to pick up once they get into the classroom” (OET, 2017, p. 35). Teacher preparatory programs were adopting new standards to ensure a competent workforce. The plan published guiding principles for teacher preparation that described an increased focus on the use of technology as part of methods courses, not as a separate course. “No new teacher exiting a preparation program should require remediation by his or her hiring school or district” (OET, 2017, p. 35-36). In-service educators would need the same principles applied through professional learning and

development programs. Although the plans set forth by our government generally described what should be done but lacks details for achieving said goals.

A New Generation Of Assessments

Assessments were drastically changing due to technology and the NETP stated a goal that reads "At all levels, our education system will leverage the power of technology to measure and use assessment data to improve learning" (OET, 2017, p. 55). Whether assessments were formal or informal, summative, or formative, they afforded invaluable data for teachers to analyze and reshape their instruction. Through technology-enabled assessments, teachers have been able to rapidly assess the needs and achievements of students. Additionally, parents/guardians were able to monitor progress with content more frequently and accurately. The new ways to reflect and evaluate were plentiful and instructionally useful given their timely feedback. MacTighe & Wiggins (2006), stressed the importance of regular informal and formal assessments when they said "A great shift requires us to be aggressive in assessing as we teach, uncovering the learners' understandings and misunderstandings all along the way." As teachers design their lessons and learning experiences, new technologies could quickly provide crucial feedback allowing more time for appropriate content.

Technology was particularly useful in light of the shift for many state standardized tests from papers to screens. Teachers were now able to provide assessments that more closely resembled the same format as the standardized tests upon which much of the public judges the schools and districts. The NETP reported, "statewide assessment—coupled with meaningful accountability—is an essential part of ensuring

students have equitable access to high-quality educational experiences" (OET, 2017, p. 55). The report iterated the importance of developing tests that were reflective of students' learning needs and afforded valuable insight.

A comparison between paper and "next generation" assessments was offered clearly depicting the benefits of using technology in assessing students' understandings. Traditional paper assessments were usually after learning with limited accessibility on a fixed path with delayed feedback using generic item types. The newer assessments were shown to be embedded within learning, universally designed with adaptive pathways giving real-time feedback using enhanced item types. Because the new assessments were versatile in both content and response time, educators could better personalize learning, collaborate with peers, and inform decision-makers or stakeholders of the effective practices juxtaposed with areas that need improvement. "Optimally, a comprehensive assessment system balances multiple assessment approaches to ensure that students, families, educators, and policymakers have timely and appropriate information to support individual learners and to make good decisions to strengthen educational systems overall" (OET, 2017, p. 57).

Assessment data were being used by teachers to inform instruction and personalize learning. Results were also being analyzed by peers, principals, districts, and the public. Importantly, technology had the capability to put these data in the hands of the students in a timely fashion. Technology-enhanced questions aimed at more complex understandings like performance-based assessments that targeted the student's ability to demonstrate skills, synthesize, analyze, and apply information. This had become much

more than multiple-choice or fill in the bubble type questions. Learner dashboards were making massive strides with "opportunities to help students take control of their own learning" (OET, 2017, p. 64). Some assessments had also been developed as *adaptive tests* that measured students' responses to cater future questions and result in a more timely precise score.

The OET (2017) recognized that "ensuring equity while also providing accelerated personalization is one of the greatest challenges and opportunities moving forward for technology in assessment." The features and characteristics of technology suggested an immense potential to provide an equitable education in terms of accessibility. Electronic devices enabled students to access different language features, change fonts, use text-to-speech or speech-to-text functions, and refreshable braille. "These advances have allowed a greater proportion of the population access to assessments" (OET, 2017, p. 60). Educators were able to provide platforms for a student body with diverse learning needs and language capabilities.

The goal for the NETP's infrastructure section stated "All students and educators will have access to a robust and comprehensive infrastructure when and where they need it for learning (OET, 2017, p. 69). The infrastructure required specific components to enable access to and effective use of technology that was: internet access, capable devices, "high-quality digital learning content" (OET, 2017, p. 69), and safety. The strides being taken to provide access became a necessity for technology in education.

Electronically Equitable Education

Exceptional Technology For Exceptional Students

Up to this point, the initial question of how to improve the efficacy of technology in classrooms had only been partially addressed. The ways of educating and learning were obviously changing and most of the questions by policymakers/advisors circled topics of infrastructure, funding, curriculum, assessments, professional development, and responsible use protocols. The topic of equity was previously mentioned when discussing the availability of technology for all students. Distribution and support for these tools are only one part of the puzzle. This section aimed to get at the heart of the question through reflection on what it meant to effectively teach with regard to equity and what role technology played or might play in the future.

Equity and equality are not synonymous. For example, the Equal Educational Opportunities Act (EEOA) of 1974 was a federal law prohibiting discrimination and requiring districts to make efforts to provide equal opportunities to learn. This measure for equality aligned with the plans to provide access to technology for all students. However, merely providing all students equal access to education fails to address the individual needs for engagement, motivation, and meaningful understandings. Equity demands recognition of individuals' cultural backgrounds and instruction that focused on outcomes as opposed to inputs. For this reason, equitable education cannot exist in a classroom without culturally responsive pedagogy (Stembridge, 2020).

A consensus of educators agreed that effective teaching requires what Zemelmen, Daniels, and Hyde (2012) described as *best practice principles*. These principles were divided into three clusters: student-centered, cognitive, and interactive. The student-centered practices were authentic, holistic, experiential, and challenging. The

cognitive cluster was informed on the assumption that “the most powerful learning comes when children develop true understanding of concepts through higher-order thinking associated with various fields of inquiry and through self-monitoring of their thinking” (Daniels, Hyde, & Zemelman, 2012, p. 8). Amazing things happen when students were given the chance to be sociable, collaborative, and democratic through interactive best practice principles (Daniels et al., 2012, p. 5-9).

In light of these principles, it was noted that technology sometimes enhanced instruction and other times was deemed unnecessary. It was maintained that “the true power of teaching resides mainly in the interaction between the mind of a teacher and the minds of learners” (Daniels et al., 2012, p. 128). Readers were cautioned that some technologies, though potentially powerful, could still draw away from the student-centered approach. For instance, the replacement of blackboards or whiteboards with bright screens meant that instruction could be aided in new ways though they were still considered a “centralized, teacher-controlled, front-of-the-room device that kids mostly watch” (Daniels et al., 2012, p. 128). The cautions of classroom technology emphasized their potential misuse to perpetuate lesser forms of teaching practices while highlighting the powerful ways it could be utilized to enhance instruction.

The responsibility of teachers to select curriculum had the potential to greatly influence successes or failures in culturally responsive pedagogy. The aim was to specifically empower students of ethnically diverse backgrounds to which the provided curriculum became a keystone component. “Curriculum content should be seen as a tool to help students assert and accentuate their present and future powers capabilities,

attitudes, and experiences" (Gay, 2000, p. 111). Choosing materials that were rooted in the lives of students and connecting to their experiences outside the classroom was essential and led to a more personalized approach.

Personalized learning was a strategy that instructed students based on their own personal backgrounds and experiences. Key components of which include data-driven decisions, student choice, and a variety of resources (FitzGerald et al., 2018). Digital tools provided effective approaches that adjust resources and assessments to the individual student. However, merely parking your car in a garage that has all the tools and parts won't get your oil changed. Arguments have been made that some teachers used technology with the same old systems but allowed students to control pacing and organization (Selwyn, 2016). Though the tools were available, it didn't guarantee meaningful implementation that pointed to the goal of equity.

Conclusion

The vision for equity in classrooms had been further challenged with the dawn of the internet. To this point in time, most of the discussions and research had focused on infrastructure and funding. Placing these powerfully transformative tools in the hands of students and teachers was arguably not enough to ensure that each student had what they needed to achieve. There were ample publications to support access to technology and support for teachers. Textbooks and research publications all highlight the transformative power of technology in the classroom. However, the original question of "*how can teachers improve the efficacy of digital content for an equitable class?*" had not been answered. There seemed to be a void of information about this topic. Future studies

would be necessary to properly bolster the efficacy of digital content for an equitable course.

Summary

Attempting to answer the question "*how can teachers improve the efficacy of digital content for an equitable class?*" has led us through many publications that discussed a wide range of topics. A push at the federal level for more technology in the classroom goes back to 1983 when our country was reportedly *A Nation at Risk*. This gave rise to the one-to-one district policies that had shaped our schools at the time of this study. Though some teachers were resistant to the adoption of said policies, there was no other route to pursue. There were notable points of progress in approaches to digital learning and goals were outlined by the Office of Educational Technology which was part of the US Department of Education. A *National Education Technology Plan* described goals and powerful uses for technology in classrooms. Education was being transformed with new tools to make innovative learning possible. It was apparent that power did not always bring effective use. Wherever equity and technology were juxtaposed accessibility ruled the research. Policymakers and publishers only mentioned students when they were trying to put them in the cloud. There was a lack of information about what to do with students and the community once they were securely in the cloud. The upcoming chapter would introduce the project developed through these reflections.

CHAPTER 3

Project Description

Introduction

Chapter three draws from the research and personal statement from previous chapters. This chapter describes the project that had been designed to help answer the question: *how can teachers improve the efficacy of digital content for an equitable class?* We began this chapter by identifying the need for the project through my personal observations as a middle school teacher. An overview of the project was to be accompanied by a rationale for the methods chosen. An overview provided the context for which the project was designed for including the intended audience, setting, and timeframe. A deeper description of the project outlined the specific goals and logistics of the project. The rationale section includes reasons backed by research for the methods chosen and the research paradigm that shaped this project.

Identifying the Need

Mindset has been shown to greatly impact learning so this section aimed to provide reasoning for the necessity of such a project. I witnessed the process of our school becoming a one-to-one middle school from inception to completion. The end product was that each student was equipped with a district-owned tablet and each room in the building had sufficient internet access. While these were intended to be used as a powerful learning tool that would give our students an edge when continuing to high school and beyond, I also observed many students that struggled to deal with the challenges that came with the package. Most students were attending eight classes per

semester. A pattern was emerging in my classroom; some students that should have been getting acceptable grades were consistently falling behind and rushing to catch-up at the end. I began speaking with students that were consistently missing assignments or turning in late work in most of their classes. In short, I found that they were having difficulties navigating the digital maze that had become our school. Though the staff were all using the same learning management system (LMS), there were vast differences in assessments, due dates, notifications, grades, and management expectations across the classes. Families were also having trouble navigating all the different aspects of digital classroom materials. The emotions of parenting struggling students became amplified with frustrations of various communication methods and technology-related roadblocks. Students and families were not the only ones struggling. Coworkers and administrators were also getting lost in the vast clouds of information bursting through their laptops. Important professional information had to be found in the district website, emails, *Google Drive*, a professional development system, an LMS, and various administrative software to name a few. The goal of this project was to provide a platform upon which staff could develop their own meaningful solutions to ensure that students, families, and coworkers are not being lost in *the cloud*. The next section provides a brief overview of the project that would provide such a platform.

Overview

This overview will briefly describe the project context, setting, and timeline. This project is intended for professional development to be utilized by working educators seeking a clearer and perhaps more unified vision of how technology impacts their school

community and what they can do to improve its efficacy. More specifically it was aimed toward middle school educators because they were at the front line of the one-to-one movement and these years were particularly formative for youth developing technology skills and communication.

This project was meant to take place within a professional development context where teachers and administrators work together to hone skills, learn from each other, and initialize worthwhile projects that assist each student in their goals. In an attempt at consistency for the student body, a suggestion would be to have grade-level teams work together. For classes that have multiple grade levels, it might be best to work together as a department or split into the other grade-level teams to regroup later and share what they've learned as a department.

The timeline for this project could vary depending on need or interest. For best results, it is intended for part of one day at the beginning of the school year with at least two more shorter sessions throughout the school year. This project was to start during the fall of 2020 and completed in the spring of 2021.

The Project

This section was to describe the project's actual planned events backed by research on adult education to suit the needs of the participants. The first of three sessions began with an introduction to the topic by asking participants to list all of the logins they have to manage as a household. The second step had them identify the logins they need professionally. This was meant to get people thinking about how they manage their digital world and reflect on how confusing it could be as a younger student with a

background different from their own. Participants were then asked to reflect on their own experiences with technology changes over the course of their lives and to define their rationale for using technology in their class. The rationale for these types of activity was rooted in Knowles' foundational principle in adult learning that calls for the learners to be "active participants in a process of inquiry, rather than passively receive transmitted content" (1992, p. 11). This activity was meant to serve as a segue into identifying the need for these sessions and eventually work toward establishing a goal for the year.

Due to the perplexing nature of the essential question in this project, the rationale for improving technology in the community were explicitly outlined. The information provided was backed by the research discussed in the literature review section of this paper. The reasons included the inevitability of technology in education, the need for consistency, simplicity, transformative learning, and equitable education through culturally responsive and personalized pedagogy.

Suggested areas of improvement for technology use were defined to the purpose of having teams reflect on those areas through different lenses of users. Participants were provided with a table that outlined four areas to analyze: navigation & organization, communication, content & curriculum, support and accessibility. In each area, participants noted technology use that was working and areas that needed improvement for each group of users; students, families, and coworkers. The last parts of the first session were centered on collaborative sharing and problem-solving. Effective professional development supports opportunities for collaboration through which adult learners can "positively change the culture and instruction of their entire grade level,

department, school and/or district" (Darling-Hammond et. al., v). Teams were asked to identify at least one area of technology they could improve for at least one group of users for the year. They were also asked to describe an action plan to accomplish their goal as a team.

Winter and spring sessions were focused on reflection and adaptation to meet the needs of the students and teachers as the project continued throughout the year. It was noted that "effective PD programs leveraged feedback and opportunities for reflection to create richer environments for teacher learning" (Darling-Hammond et. al., 15). The winter session provided time for teams to review their work and hear about other teams' progress. Teams were allowed to revise their goals and begin collecting information for a presentation in the spring. This project was designed to minimally span the course of a year because it had been shown that meaningful, transformative professional development requires sustained timelines rather than single-instance workshops (Darling-Hammond et. al., 15-16).

Participant Learning Objectives: Through effective planning and implementation of this project participants would be able to work toward achieving the learning objectives listed below.

- Participants will be able to reflect on the impact of technology in their classrooms.
- Participants will be able to identify the specific needs of students, families, or coworkers related to technology and learning.

- Participants will be able to develop a mutually agreed-upon plan to improve the use of technology for a user group.

Rationale

The rationale section intended to provide a foundation for the study as described through research design paradigms, theories, or frameworks. This study stemmed from a constructivist worldview wherein research was focused on qualitative data. This particular viewpoint assumed that individuals construct meaning from the world around them. Another assumption was that people shaped their understanding through their historical and social perspectives. This assumption bolstered reasoning to provide experiences that were rooted in the experiences of the participants. Social constructivist approaches also assumed that meaning arises from and through social interactions. Broad general questions aimed to study the participants' views on technology in the classroom, how it impacts learning, and what they could do to improve its efficacy. Responses to such questions were expected to vary as each team would construct meaningful solutions to suit their needs. This study was designed to be largely inductive due to the open-ended manner of the project (Creswell 2014).

Summary

This project was designed to begin answering the original research question: *how can teachers improve the efficacy of digital content for an equitable class?* A need was established through professional experiences where students were getting lost and confused with the vastly different approaches to digital instruction in their classes. For this reason, a project was designed to be carried out in the form of professional

development minimally implemented over the course of the 2020-2021 school year. Research cited in *The Project* section illustrated thoughtful project planning to ensure meaningful and productive adult education for the participants in the professional development program. The design was foundationally conceived via a constructivist worldview due to the open-ended research question and the inductive nature of data collection.

The next chapter will be a reflection on the project. We will discuss learnings through the lenses of a researcher, a writer, and as a learner. More information will be provided about the sources of literature that helped shape this project. Implications, limitations, and benefits of the project will also be discussed. Suggested future studies and future plans for the project will conclude the final chapter.

CHAPTER 4

Conclusion

Introduction

This chapter shares my concluding thoughts on my learnings through the capstone process as a researcher, writer, and learner. The research and capstone project aimed to answer the research question: *how can teachers improve the efficacy of digital content for an equitable class?* Reflecting on the research and project development is essential to encompass the effect this process has had on me. The reflection portion of this report will shed light on the most influential sources of information along with the connections and new understandings I have developed. A reflection on the project will touch on the implications, limitations, future recommendations, and its impact.

Reflection

Regarding Research

I was curious about where to begin my research. Being that public schools are an entity of the government, I was curious about publications that had led us to this point in history. *A Nation at Risk* was an important milestone that highlighted the importance of a relationship between technology and education. The document was published in the early 1980s which means the technology available at the time was nowhere near what we have today. While I was reading, it seemed as if the report could be directly applied to the system we currently operate. In the public eye technology in classrooms became a launching pad for careers and applicable life-skills. I can't help but wonder if this is what spurred the business relationships schools have built with technology companies. I think

about my middle school and how every room was outfitted with expensive interactive smart-boards that still cover the once coveted dry-erase whiteboards while an old tube TV sits in the corner above a VCR. There's even a projector screen hanging behind the smart-board across from an empty projector mount on the ceiling. Now everyone has a district-issued tablet. Of all those gadgets, the ones least used to their potential were the costly interactive smart-boards which are now being replaced with flat-screen televisions. Technology has become a selling point for enrollment and a focal point for administrators.

The inevitability of technology in classrooms was not embraced by all. Throughout my years of teaching, I have met many educators that would avoid new digital tools. This led my research to a report by Rogers called *Barriers to Adopting Emerging Technologies in Education* (2000). The report was able to name and describe the barriers that educators face to adopting new technology. Internal and external barriers mutually impacted how teachers viewed these new resources. Identifying these barriers allowed me to more precisely aim my research and develop a plan that would remediate this wide-spread problem.

The need for improving technology in our school communities was an easy conversation starter with colleagues. Each educator that I spoke with would comment about how essential this conversation is to their community. Though the importance is clear, I haven't yet spoken with a person that is familiar with the National Education Technology Plan (NETP) that is published periodically through the U.S. Department of Education Office of Educational Technology (OET). The reality was none of us even

knew the organization existed. I was shocked when I found their website and thought that they would surely answer my many questions about improving the efficacy of technology in our school community. After diving through almost every resource they provided, my list of questions had only grown. While this source provided ample information regarding the power of technology in education, I felt there was a gap in which my situation tumbled. The equity conversation for this source trended toward equal access to the physical pieces of technology and internet access. Reports from the OET seemed more to boast the successes of giving students access while demanding more from teachers and rarely discussing the shortfalls of confusing communities with an overload of technology. Though these reports were valuable, I needed to find more information and approach to the main question from different angles.

Making a positive change in an educators community, one must include equity. When I started the research for this project, I had a very simplified idea of what equity actually meant. I had thought equity meant making sure every student has what they need to succeed in school. Through this process, I feel much more confident discussing the true meaning of equity with my colleagues and peers. Zemelmen, Daniels, & Hyde's *Best Practice* (2012) text was foundationally formative in this regard. Their work helped me better understand that the dynamic relationships between students, teachers, content, and methods were crucial to the process of developing an equitable practice. Furthermore, when Selwyn asked *Is Technology Good For Education?* (2016), they were able to paint a clear picture of the powerful potential of technology for the purpose of transformative, personalized learning that sows the seeds for equity. Additionally, equity necessitates the

inclusion of culturally responsive pedagogy. This was made abundantly clear by Stembridge (2020). My original concept of equity has changed as a result of my research and I've made a concrete distinction between equity and equality.

While attempting to improve the efficacy of technology in school communities for equitable education, I have learned a lot as a researcher and a writer. Schools have become bound to technology. Many teachers are still struggling to embrace new technologies. The federal government is trying to help by promoting equal access to technology but falls short in addressing some major pedagogical issues. Technology has the potential to empower classroom communities or confuse them. After all of this research, perhaps one of the biggest lessons I've learned is that the responsibility of wielding these new tools falls squarely on the shoulders of our educators. For this reason, I developed a professional development program to allow teachers the opportunity to make positive changes for their communities. The implications, limitations, future recommendations, and impact of the project are discussed in the next section.

The Project

The professional development program is called *Lost in the Cloud* because the recent rise of one-to-one technology rollout has reached a point that confuses, frustrates, and alienates people. The hope was for educators to come together for a positive change in the ways they use technology in their school community. Possible implications of the project include the potential use in my own school as we move forward into the turbulent times of hybrid and distance learning. Policies are already being made for schools that require teachers to use specific learning management systems. This program can help

them avoid miscommunications, frustrations, and ultimately improve the day-to-day operations. Instead of a top-down approach with specific formatting guidelines, this professional development allows teachers to maintain a sense of autonomy.

Every attempt was made to ensure the program would be applicable in a wide variety of schools yet there are limitations. In every professional development I have attended, there are always some teachers that have a difficult time buying into the objectives. Resistance may be a result of internal or external factors. Because this requires a team to cooperate on a self-determined action plan, each member must be willing to make a concerted effort. Another limitation would be the apparent lack of accountability. We can't be constant observers in other teachers' rooms so it could be difficult for people to follow through if they need more assistance throughout the year. The decisions made through this professional development are limited by the amount of support provided.

Based on my findings, I would recommend future studies to investigate the support that districts provide for teachers regarding technology. Teachers are already dealing with a high volume of demand and a lack of time to cover it all. It would be beneficial to ask questions about processes for vetting technology applications. While deciding on a specific learning management system might be the district's choice, teachers across schools, subjects, and grade levels have different technology needs. For example, a high school math teacher will most certainly require different support than an elementary teacher. I would be curious to read more about how different schools are tackling issues with technology.

Perhaps another obvious route of future research would be collecting and analyzing data from schools that are forced into distance learning for safety reasons. The topic could be broad but I would focus on how the technology was being used by teams of teachers. If a group of teachers had an agreed upon standard method, would the number of lost students or families be significantly different from a similar school without a consensus? Due to the constant changes in available technology, the possibilities for future studies are virtually endless.

In the future, I plan to share my research and project with my building principal and professional development coordinator. Minimally, I would like to see them find value in the message and make an attempt to address some of the many problems. If they decide that I should help run the professional development sessions, I would ecstatically accept. My hope is that this project will serve as a way for education professionals to make positive changes in their communities through effective use of technology. The next section will summarize the main points for this chapter.

Summary

The lessons I have learned while asking the question *how can teachers improve the efficacy of digital content for an equitable class?* are numerous. Through my research I have learned that education and technology have been and will continue to be inextricably intertwined. There has always been some resistance to employing new technologies in education. Providing access to technology alone does not ensure the education is equitable. The individual backgrounds of students need to be front and center

in curriculum development and technology deployment. I found that the decision to improve these experiences with technology in schools has to be made by the teachers.

The project itself has valuable implications for any school that uses technology. I hope to use this professional development program in my own school and possibly across the district. Limitations included participant resistance, accountability, and support throughout the year. Investigating supports afforded to teachers for vetting applications of technology is a potential future study. Additionally, collecting and analyzing data to study the effects of communal technology decisions during distance learning would be beneficial to the profession.

In conclusion, there have been many revelations during the process of research, writing, and project development in this formal capstone project. The new understandings and connections I've made will be beneficial to myself and the profession as a whole. I still have many questions that will continue driving me to improve equitable practices. Technology is not leaving the schools anytime soon and it is our responsibility to use it to the fullest potential.

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